A671.006103
20
670

THE REVIEW

DEVOTED TO THE INTERESTS OF THE AMERICAN SOCIETY FOR METALS

Volume XV DECEMBER, 1942 No. 10

JOHN CRERAR LIBRARY DEC 21 1942

Merry Christmas

Messerschmitt Reaches Phila. 1200 Benefit

Reported by Edward L. Murphy
Research Assistant, The Midvale Co.

Philadelphia Chapter — One autumn evening in 1940 a German plane set out for England on a mission of destruction. It did not return. On Oct. 2, 1942 the Messerschmitt engine from that plane was the center of attraction as some 1200 people viewed it with mixed interest and curiosity at Temple University's Mitten Hall.

This 12-cylinder, inverted, liquid-cooled power plant arrived at Mitten Hall via the Wright Aeronautical Corp., where extensive studies and tests of its construction and performance were conducted. The results of this investigation formed much of the subject matter for an enlightening discussion by R. W. Young, Wright's chief engineer, and B. Clements, chief metallurgist.

Slides Show Engine Parts

After tracing the history of the development of German aircraft engine manufacture, Mr. Young presented a series of slides showing the various assemblies of the Messerschmitt and their integral parts. Each illustration was clearly explained and compared with similar parts of American and British manufacture.

The metallurgical features of the engine were discussed by Mr. Clements, who listed the physical properties, hardness and chemical com-

(Continued on page 4, column 5)

French Reviews Alloys; Eisenman Lauds WPAC

Reported by L. E. Day
Development Department, Carrier Corp.

Syracuse Chapter—The Nov. 4th meeting was notable because of the presence of National President H. J. French and National Secretary Bill Eisenman.

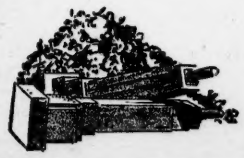
Bill entertained the directors of the Chapter at a luncheon and made a short talk at the evening meeting. He emphasized the part that the A.S.M. is doing in the war work and told how important and successful was the recent National Metal Congress in Cleveland.

He complimented the local War Products Advisory Committee on having contributed the longest distance consulting service.

Mr. French gave the main address of the evening, on "Alloys and Emergency Alloy Steels". Since this talk will be presented before many of the chapters during the winter, it will not be reviewed here.

The Steel Industry
Needs Your Scrap

Every day the steel industry needs more scrap to keep its furnaces going than the tonnage of steel contained in two Empire State Buildings.



Shows Hand Tools Use New Steels

Reported by J. E. Howell
Chief Metallurgist, Plomb Tool Co.

Los Angeles Chapter—Chairman Bill Farrar gave a short coffee talk at the meeting on Oct. 29, telling some interesting highlights of the National Convention.

In the course of Mr. Farrar's talk he pointed out how much the National Emergency steels are being used and substituted for the old AISI and SAE steels.

The main speaker of the evening was Morris B. Pendleton, president of Plomb Tool Co., whose subject was "Service Hand Tools, Their Manufacture and Metallurgy". During the course of his speech, Mr. Pendleton emphasized the value of metallurgy in the manufacture of hand tools.

Mr. Pendleton highlighted his talk with the necessity for us to cooperate with the Government and use as much National Emergency steel as we possibly can. He felt confident that we, as metallurgists of the Los Angeles area, would be able to do just as much with the steels now available as we did with the former compositions.

S-Curves Now A Practical Tool Of Heat Treater

Reported by C. A. Nagler
Metallurgist, Tool Steel Division Twin Cities Ordnance Plant Federal Cartridge Corp.

North West Chapter—"The subject of S-curves is relatively new", said E. S. Davenport of United States Steel Corp. Research Laboratory, speaking on "Isothermal Transformation of Steel" at the meeting on Oct. 22.

About 50 members attended the dinner preceding the meeting, which was held in the spacious main lounge of the Coffman Memorial Union, University of Minnesota.

The S-curve of steel gives us an opportunity to investigate heat treatment from the standpoint of isothermal transformation, Mr. Davenport explained. The S-curve is useful and practical and is no longer a theoretical tool of the laboratory metallurgist.

The method of carrying out an S-curve determination is rather simple and the procedure was described briefly.

The speaker covered, in some detail, the effect of alloying elements in steel as revealed by S-curve studies on a large number of typical SAE steels. In general, all of the alloying elements, with the exception of cobalt, retard the transformation of austenite and thus contribute to increased hardenability. Increasing the austenite grain size has a similar effect.

Another point that was stressed was that there is no merit in having alloy in steel unless we take advantage of it by using a suitable austenitizing temperature and time, thus bringing about the desired degree of solution of the carbon and alloy in the austenite before commencing the cooling operation.

The meeting at the close of the talk was thrown open to discussion from the floor. A.S.M. members and their guests had a goodly number of questions to ask the speaker, who did an excellent job of supplying the desired information.

Extends Season's Greetings to its 15,334 Members Throughout the United Nations

NE 9400 May Dominate, McQuaid Says

Reported by Walter M. Saunders, Jr.
Consulting Chemist and Metallurgist

Rhode Island Chapter—"There is no problem in metallurgy that cannot be licked by common horse sense" said Harry W. McQuaid, assistant chief metallurgist of the Republic Steel Corp., at the initial meeting on Oct. 7. These words from a well-known metallurgist, speaking on the subject of "National Emergency Steels", were decidedly encouraging to many listeners in his audience, who are now wrestling with the problem of substitutions.

Gives Maximum Uniformity

The NE steels are fast approaching two definite grades, in the opinion of Mr. McQuaid, but the one type which may become dominant is the chromium-nickel-molybdenum series, now known as 9400.

Because of high residuals from scrap, this series can be easily produced without exceeding the limit for any of these elements, and is considered the finest type by the WPB. It seems to give maximum uniformity of product, and can be substituted for any steel of equivalent hardenability in the range of 200 to 400 Brinell. This range applies chiefly, of course, to the so-called constructional steels.

(Continued on page 4, column 3)

Orchids

To **C. H. Mathewson**, chairman of the department of metallurgy, Yale University, on his election as president of the American Institute of Mining and Metallurgical Engineers; and to **Charles H. Herty, Jr.**, assistant to vice-president, Bethlehem Steel Co., on his election as a director.

-*-

To **National Tube Co.**, Lorain, Ohio, on the completion of 550 miles of 24-in. pipe for the oil line between Texas and Illinois in exactly four months, and the commendation earned from Petroleum Coordinator Harold L. Ickes.

-*-

To **H. H. Uhlig** of General Electric's Schenectady research laboratory, on election as vice-chairman of the Corrosion Division of the Electrochemical Society.

-*-

To **R. Edson Emery**, president of Jessop Steel Co., on the celebration of his 42nd anniversary of service in the steel industry.

Chicago Discussion on New Deoxidation Alloys Sets Pace for Seminar

Vivid Word Pictures Illustrate Right and Wrong Heat Treatment

Reported by A. E. Cartwright
Robert Mitchell Co., Ltd.

Montreal Chapter—Before a capacity audience on Nov. 2, R. C. Stewart, metallurgist of Apco Petroleum Products, discussed brilliantly the complicated subject of "Heat Treatment of Metals".

Dealing basically with the data derived from the S-curve, the speaker proceeded to draw vivid word pictures of the effects produced by rightly and wrongly applying interrupted quenching, austempering and tempering.

Elastic and plastic deformation and the stresses produced by various quenching treatments in water, caustic soda, brine, and oil were shown to be controllable to produce desirable elastic stress or absence of stress in the part being treated.

To round out a most practical and interesting presentation, Mr. Stewart showed many interesting slides recording the dire results produced by faulty heat treatment practice and faulty engineering designs.

Preceding the technical session, a beautiful and instructive color-sound film entitled "Three-Dimensional Color" was presented by courtesy of Canadian Industries, Ltd.

Transactions Index on Way

An index of Volume XXX of TRANSACTIONS, covering the four quarterly issues in 1942, is being prepared and will be available about Jan. 15. There is no charge to members for this index. Requests should be sent to the American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio.

Reported by Alfred F. Finkl
Vice-President, A. Finkl & Sons Co.

Chicago Chapter—The first meeting of the annual "Seminar" series set a standard, as F. J. Robbins, the Seminar Committee chairman, remarked, which, if followed in subsequent meetings, will make this year's series particularly outstanding.

The four speakers on the program were Jerome Strauss of Vanadium Corp. of America, A. B. Kinzel of Union Carbide and Carbon Corp., N. F. Tisdale of Molybdenum Corp. of America, and Albert L. Kaye of Carnegie-Illinois Steel Corp.

The topic of the Seminar was "Special Methods of Steel Deoxidation With Regard to Alloy Substitution".

Grainal Saves Nickel

Mr. Strauss, who was the first speaker, discussed the vanadium-containing hardenability intensifier known as "Grainal". This, he said, is effective for all types of steel, even the basic electric, although the latter requires more of the hardenability intensifier.

One of the most interesting of Mr. Strauss's hardenability slides was one showing curves for SAE 2330, both untreated and treated with Grainal. Using Grainal, 40 to 50% of the nickel could be omitted and yet the same hardenability could be obtained.

The second speaker, Dr. Kinzel, discussed "Silcaz", which is a balanced deoxidizer containing enough silicon, aluminum, calcium, zirconium, titanium, and boron to deoxidize the steel as usual, and to act as a hardenability intensifier.

Dr. Kinzel praised the work of Dr. Grossmann on hardenability and showed how this enables one to "get something for nothing". Dr.

(Continued on page 4, column 2)

Unusual Features Affect Selection Of Heat Resisting Alloys and Designs

Reported by G. L. White
Canadian Metals and Metallurgical Industries

Ontario Chapter—Speaking at the second meeting of the Chapter, at Hamilton on Oct. 9, T. G. Beament, manager, Fahralloy Canada, Ltd., Orillia, Ont., covered selection of material and designs in the application of heat resisting alloys.

It must be strongly emphasized that the selection of heat resisting alloys for a high temperature installation involves many important features which are not encountered in ordinary engineering practice, such as phase changes, wide limits of expansion and contraction, and gradients within alloy sections.

These heat resisting alloys may be considered to be alloys for use at temperatures where iron, steel or non-ferrous alloys fail by oxidation or high temperature corrosion, that is, the range from about 1200 to approximately 2150° F.

Surface Stability Important

From the chemical standpoint, the most important property of heat resisting alloys is surface stability at high temperatures. High temperature surface stability under varying conditions cannot be found in a single all-purpose alloy. A slight change in a variable may completely upset conclusions drawn from past performance in apparently similar processes.

Classified in Three Groups

The next most important property is the physical strength of the alloy at the operating temperature. In fact, physical strength is commonly the governing factor in selecting a high temperature alloy but should always be considered in combination with surface stability and sometimes with other characteristics of the alloy.

While there is a gradual merging of one classification of heat resisting alloys into another, they may be roughly grouped as follows: *(a)* Chromium-iron plus minor constituents, *(b)* chromium-nickel plus minor constituents, and *(c)* chromium-nickel-iron, ternary series.

The speaker discussed certain alloys in each of these groups showing the purposes to which they are

(Continued on page 4, column 1)

V 15 - 10
DEC 42
XUM

THE REVIEW

Published monthly except July and September by the

American Society for Metals

7301 Euclid Ave., Cleveland, O.

HERBERT J. FRENCH, *President* — W. H. EISENMAN, *Secretary*
M. A. GROSSMANN, *Vice-President* — F. B. FOLEY, *Treasurer*

Trustees

VSEVOLOD N. KRIVOBOK — KENT R. VAN HORN
ERLE G. HILL — NORMAN F. TISDALE
BRADLEY STOUGHTON, *Past President*

Subscriptions fifty cents a year; five cents a copy. Entered as Second Class Matter, July 26, 1930, at the Post Office at Cleveland, Ohio, under the Act of March 3, 1879.

Ray T. Bayless.....*Editor*
M. R. Hyslop.....*Managing Editor*

Cleveland, Ohio — December, 1942
Volume XV — No. 10

More Comment by the Press

On The National Metal Congress & Exposition

The Battle of Metals

By Burnham Finney
Editor, American Machinist

MEN AND METAL WILL WIN THE WAR. Men have to be trained for military service. Metal has to be converted into war machines without which men are powerless in modern battle.

Men must be assigned to particular duties and transported to far-flung fronts. Metal must be conserved and employed effectively if it is to yield the maximum number of tanks and planes and guns.

To do this we must banish waste and enlist improved manufacturing techniques. We must put to work steels with lowered alloy contents in place of the generously alloyed analyses of our more affluent days. Aluminum, magnesium, bronzes and the other metals so vital to war industries need better processing to get the most out of our limited stocks.

We must adopt a wartime metallurgy and wartime shop practices. Above all we must exchange our findings freely so that each of us may profit by the errors and the experiences of others working toward the same goal. For we have a common job to do and the sooner it is done, the better.

The National Metal Congress, and the Exposition that goes with it, provide an opportunity to give and take the results of technical research and shop experience. New metals, new processes and new equipment are all part of the program. Increased output is the keynote and winning the war the ultimate objective.

Our men are fighting in many lands. Let us back them up 100% in this battle of metals.

American Machinist
Oct. 1, 1942

War Production Edition of Metal Show

THIS is a War of Metals. It is to be also a War of Men according to Major General Lewis B. Hershey's recent statement that 13,500,000 men will be needed for the Armed Forces of the United States.

Thus will emerge the combination of *men* and *metals* with which we shall crush the aggressor nations. If the brunt of the offensive action can be borne by America's metal working industries through the medium of their products, a tremendous saving in human life can result.

To this end the American Society for Metals, the Wire Association, the American Welding Society, and The Iron and Steel and Metals Division of the Metallurgical Engineers are gathering in Cleveland to pool their technical knowledge and skills for the sole purpose of increasing and improving production of war materiel.

The members of these four societies by freely exchanging their hard-won data, the exhibitors by their showings of new and improved processes, materials and equipment, and war plants by accepting and placing in operation every advancement offered, will make notable contributions to saving of American soldiers' lives through betterment of military equipment.

Every technical session, every discussion, every exhibit of the 1942 National Metal Congress and War Production Edition of the National Metal Exposition was planned as a contribution toward speeding production of tanks, planes, ships and guns and improving them to the end that they will be superior to those of all other nations.

The Tool & Die Journal
October, 1942

Pneumatic Machines at Metal Congress

MACHINES for compressing air and other gases are making scores of new contributions to the nation's war effort.

This was shown in a survey of the recent National Metal Congress at Cleveland made by the Compressed Air Institute. The congress is the nation's largest exhibit of new production methods used in the most strategic industries.

Some of the new developments in uses of compressed air and gases are:

Thoroughly dried compressed air for operating controls in the new rubber and polymerization plants.

Safety applications of compressed air in blanking, punching and stamping machine clutches to make it absolutely impossible for the operator to injure his hands.

Alternate cooling and warming of highly accurate gages to keep their dimensions constant while in use.

Pneumatically operated elevators which permit the quenching of as many as 8,000 lb. of heated aluminum alloy castings in 24 sec.

New applications of compressed air in the operation of resistance welding machines to make them more effective, and more flexible.

Cooling of bushings, collars and other metal parts to as low as —75° F. and chilling of aluminum rivets to —50° F.

Production of extremely low temperatures to test new synthetic rubber products.

Use of sub-zero temperatures to remove pitch from optical glass.

Use of compressed air to spray shell cases with heavy oil during blanking operations.

Blowing alkali off metal after it has been degreased.

Blowing out of excess moisture from the interiors of large shells after they have been cleaned.

Chilling of oils and other coolants used in high-speed cutting of precision machine parts.

Use of compressed air in feeds for tools on lathes and other machines in combination with oil under pressure. *Compressed Air Institute*
November, 1942

President Names A.S.M. Committees

E. Bancroft — *G. V. Luerssen* — *F. B. Foley*

M. Gensamer

New Members and Chairmen Announced At Board Meeting

At the meeting of the Board of Trustees of the A.S.M. held Nov. 13, new appointments to the various national committees of the Society were announced by President French and confirmed by the Board.

In order that the members may have a roster of the standing committees as they are constituted at the present time, the complete personnel is listed below. The new appointments are shown in italic type and the numerals represent the date of expiration of membership.

Constitution and By-Laws Committee

Ernest Bancroft, Hartford, Conn., Chairman, '43
L. E. Ekholm, Conshohocken, Pa., '45
Ray McBrian, Denver, '43
J. W. Queen, Jr., Jersey City, N. J., '45
Kurt Siems, Cincinnati, '44
Norman F. Tisdale, Representative of the Board of Trustees

Educational Committee

C. W. Mason, Ithaca, N. Y., Chairman, '43
R. T. Bayless, Cleveland, Secretary
J. L. Bray, Lafayette, Ind., '45
O. W. Ellis, Toronto, '45
Joseph G. Jackson, Philadelphia, '44
John T. Norton, Cambridge, Mass., '44
B. R. Queneau, New York, '43
T. H. Wickenden, New York, '43

Finance Committee

F. B. Foley, Philadelphia, Chairman
Glenn Coley, Detroit, '45
James P. Gill, Latrobe, Pa., '44
Zay Jeffries, Cleveland, '44
Walther Mathesius, Pittsburgh, '44
A. D. Potts, Lockport, N. Y., '45
Kent R. Van Horn, Cleveland, Consultant

Metal Progress Advisory Committee

H. J. French, President, A.S.M.
M. A. Grossmann, Vice-President, A.S.M.
W. H. Eisenman, Secretary, A.S.M.
R. T. Bayless, Assistant Secretary, A.S.M.
E. E. Thum, Editor
R. C. Dalzell, Detroit, '45
A. H. d'Arcambal, Hartford, Conn., '44
R. H. Hobrock, Detroit, '44
Zay Jeffries, Cleveland, '44
C. D. King, Pittsburgh, '45
Roy G. Roshong, Chicago, '43
C. W. Ruth, Cleveland, '44
R. A. Wheeler, New York, '44

Metals Handbook Committee

G. V. Luerssen, Reading, Pa., Chairman, '44
J. E. Donnellan, Cleveland, Secretary
E. C. Bain, Pittsburgh, '43
A. J. Herzig, Detroit, '45
A. L. Kaye, Chicago, '45
C. H. Lorig, Columbus, '45
J. T. MacKenzie, Birmingham, '45
H. D. Newell, Beaver Falls, Pa., '43
N. I. Stotz, Titusville, Pa., '43
Gordon T. Williams, Moline, Ill., '44
Lyall Zickrick, A.I.M.E. Representative
H. L. Maxwell, A.W.S. Representative
C. W. Obert, I.A.A. Representative

Publication Committee

M. Gensamer, Pittsburgh, Chairman, '43
R. T. Bayless, Cleveland, Secretary
J. B. Austin, Kearny, N. J., '44
R. M. Brick, New Haven, Conn., '45
Walter Crafts, Niagara Falls, N. Y., '44
T. G. Digges, Washington, '43
E. H. Dix, Jr., New Kensington, Pa., '43
A. E. Focke, Indianapolis, '45
W. R. Frazer, Athol, Mass., '45
W. E. Jominy, Detroit, '44
E. G. Mahin, Notre Dame, Ind., '43
Gilbert Soler, Canton, Ohio, '44
Clair Upthegrove, Ann Arbor, Mich., '44
T. S. Washburn, Indiana Harbor, Ind., '45
S. P. Watkins, Baltimore, '45
L. L. Wyman, Schenectady, N. Y., '44

Lecture Course On Magnesium Starts N. J. Series

Reported by R. L. Rickett
Research Laboratory, U. S. Steel Corp.

New Jersey Chapter—"Magnesium and its Alloys" was the subject of the first series of educational lectures sponsored by the Chapter during the 1942-1943 season. The lectures were held on the evenings of Sept. 28 and Oct. 5 and both were given by Otis E. Grant of the Dowmetal Division, Dow Chemical Co. The practice of having a single speaker for the series was followed in order to insure continuity of the lectures.

Mr. Grant covered practically every phase of the production and fabrication of magnesium and magnesium alloys. Melting practice was discussed, also the making of castings, forgings, extruded shapes, and sheets.

Many details were given concerning heat treatment of the alloys and such operations as machining, deep drawing, punching, riveting and welding. Of particular interest was the information that many punching and forming operations are done hot; exceedingly deep draws can be made in a single operation when the tools and blank are heated.

Machinability Is Good

Mr. Grant also mentioned that magnesium and its alloys have exceptionally good machinability. His discussion of machining included the precautions to be taken in carrying out the various manufacturing operations in order to avoid fires, and methods of putting out magnesium fires.

Information on the latter subject was supplemented by an excellent motion picture which was loaned for the occasion by a nearby plant.

Attendance at the lectures was excellent, about 75 or 80 being present each evening.

Change in Quenching Is Tool Hardening Villain

Reported by Donald E. Roda
General Foreman
Rochester Products Div., General Motors

Rochester Chapter—Howard J. Stagg, sales metallurgist, Crucible Steel Co. of America, talked to the Rochester Chapter for the fourth time in ten years at the November Meeting on "Hardening of Tool Steels".

He devoted this talk to the importance of the volume change accompanying the phase change on quenching of tool steels. This, he said, is the major villain of tool hardening.

Mr. Stagg's talk was reported in detail in the November issue of THE REVIEW.

S-Curve Ties Together Known Heat Treat Facts

Reported by James C. Erickson
Deere & Co.

Tri-City Chapter—E. S. Davenport, United States Steel Corp. Research Laboratory, described the S-curve as a new approach to the old subject of heat treating in his talk at the October meeting in Rock Island.

At the present time the transformation to pearlite and bainite on the upper part of the curve is fairly well established and understood; however, the lower temperature transformation to martensitic products is still being studied by a number of investigators.

Carbon Slows Transformation

The effects of various elements on the S-curve were illustrated by lantern slides. It was shown that increased carbon slows the transformation at the lower temperatures.

Eutectoid steels are the slowest to transform at the nose of the curve, thus explaining why the eutectoid steels are deeper hardening than steels of either hypo or hyper-eutectoid composition.

As the austenite grain size of steel increases, the speed of transformation at the nose decreases. The grain size has little or no effect on the speed of transformation at lower temperature levels.

The effect of higher austenitizing temperatures is to increase the grain size and in the case of alloy steels it also puts more alloy in solution in the austenite, thus giving the combined effect of higher alloy and larger grain size.

The speaker answered his own question of what the S-curve has accomplished in this way: "It has tied together a number of isolated facts that have been known about heat treating for a long time."

"The S-curve approach," he stated, "is a system of thinking about heat treating. Each curve can be considered as a sort of portrait of the particular steel in question."

A coffee talk entitled "F.B.I. War Duties" by Special Agent W. G. Maupin of the Federal Bureau of Investigation preceded Mr. Davenport's address.

Borough of Manhattan, N. Y., contains 27,000,000 tons of steel, of which 23,000,000 tons are in skyscrapers and other buildings.

Al Fabrication Shown

Reported by E. Leslie Henrickson
Michigan College of Mining and Technology

Michigan Tech Chapter—Three movie sound films shown at the meeting on Nov. 19 were provided by the Aluminum Co. of America from their "how to do it" series. They were entitled "How to Weld Aluminum", "How to Rivet Aluminum", and "How to Machine Aluminum".

The meeting attracted a large attendance and the interest shown indicates the desirability of further programs of this character.

Development Of NE Steels Is Outlined

Reported by T. L. Stivers
Associate Metallurgist, Naval Gun Factory

Washington Chapter—The increased demand in the field of alloy steels has made the development of the National Emergency steels one of the major engineering achievements of the past year. The Chapter therefore turned out in force for the opening dinner meeting to hear Charles M. Parker in his illuminating discussion of NE steels.

Mr. Parker traced the development of the National Emergency steels by a committee of the American Iron and Steel Institute, the Society of Automotive Engineers, and various producers of alloying elements.

The only alloying elements (other than scrap residuals of Ni, Cr, and Mo) which appeared to be available to the industry in not too restricted quantities were manganese and molybdenum. The manganese-molybdenum steels that were developed were in use only five or six months when molybdenum became critical and it became necessary to develop steel compositions containing less molybdenum than used heretofore, or no molybdenum at all.

Hardenability Is Guide

A program was laid out in which steel producers and producers of ferro-alloys melted experimental heats of the new compositions and secured hardenability curves for each steel. The committee was of the opinion that for general applications a comparison of standard end-quench hardenability data would suffice as a guide to the application of alternate steels.

The decision was based on the well-known fact that hardness is related to tensile strength, yield strength, and ductility as measured by reduction of area and elongation. Regardless of composition, steels of the same hardness produced by tempering after hardening will have the same tensile and yield strength provided the original quenched structure is substantially martensitic.

Residuals Controlled in 9000 Series

In the newer 9400, 9500, and 9600 steels the quantities of residual alloys are specified, and with a control of these residual elements it has been possible to obtain steels with a high uniformity from heat to heat as to their physical and hardenability characteristics.

The quantities of residual alloys in many heats of standard SAE steels have, for the most part, been present in sufficient quantity to alter the characteristics of the specified steel to a considerable extent. The maximum advantage is attained by recognizing the amounts of all residual elements that are present.

A spirited discussion emphasized the intimate contact that Mr. Parker has had with this field. He predicted that while many NE steels will persist after the war, our problem now is to be ready to shift to a different steel with a 24-hr. notice.

NE Steels Program Just Beginning—Jameson

Reported by Wilhelm Olson
The Atwood Vacuum Machine Co.

Rockford Chapter—"Bob the Magician" provided local talent in the form of a demonstration of magic as dinner entertainment at the regular meeting on Nov. 27.

The technical talk was by A. S. Jameson, works metallurgist, International Harvester Co., and dealt with the National Emergency steels.

Comparisons both as to analyses and physical properties between the old standby's and the NE steels were made. Apparently, the NE steel program has not begun in earnest, judging from the fact that very few plants have yet handled any great amounts.

"Young Fellows' Night" Proves Popular

The Main Speaker of the Evening, J. C. Murray of Jones & Laughlin Steel Corp., Is Seen at the Right of This Picture of Pittsburgh's "Young Fellows' Night". Center is Chapter Chairman H. K. Work, and at the left T. B. Blackwood, chairman of the meeting.

Pitt Hears First-Hand Account Of Britain's Wartime Steel Industry

Reported by Gerhard Derge
Metals Research Laboratory
Carnegie Institute of Technology

Pittsburgh Chapter—The usual popularity of "Young Fellows' Night" filled the banquet room to capacity for the November meeting. Metallurgy students from Pitt and Carnegie Tech were special guests and occupied the center table. Thomas B. Blackwood of Universal-Cyclops Steel Corporation was chairman of the committee and presided at the meeting.

A special feature of the program was the coffee talk by Chet Smith, sports editor of the Pittsburgh *Press*. Mr. Smith proved his descent from a long line of skilled raconteurs with a collection of his best football stories.

The talk on the "Wartime Steel Industry of England" by John C. Murray, assistant general superintendent of the Pittsburgh Works of the Jones & Laughlin Steel Corp., was very informative and timely. Mr. Murray related his experiences as a member of the American Steel Mission which was sent to England last summer to observe the operation of the industry under war conditions.

The general impression derived from the numerous specific cases cited was that the low grade of ores available and the lack of modern high tonnage units places a huge handicap on the British steel industry when it is faced with the production demands of wartime.

A good example of the type of difficulties encountered is the fact that in Wales they find it necessary, due to a shortage of wood, to use steel for mine timbers.

Although the heavy bombing of the Germans has damaged 20% of the buildings in England and Scotland, the steel industry was not crippled and it is now operating at near capacity rates.

This is due in part to the willingness of all to pitch in and work to the limit of their abilities and the successful and extensive use of women and young boys. The rolling and finishing mills are operating exceptionally well.

The scarcity of good food and the absence of the usual convenience and luxury in the hotels was also apparent, but Mr. Murray felt that these shortages were being administered and accepted extremely well.

At the conclusion of the talk and formal discussion the bar was rolled in and the meeting finished off with beer and pretzels.

Discussion Invited on Transactions Papers

THE FOLLOWING papers are in preparation for publication in the TRANSACTIONS of the Society and anyone interested in receiving a copy for the purpose of submitting written discussion can receive galley proofs by notifying the National Office:

Determining the Ac₁ Critical Point in Iron by a Grain Examination Method, by John K. Desmond, Frankford Arsenal.

Some Factors Affecting Longitudinal Bend Tests on Fine-Grained, Cold-Rolled Annealed Carbon Strip Steel, by A. F. Sprankle & M. A. Hughes, Carnegie-Illinois Steel Corp.

Officers Visit Ontario Chapter

Reported by G. L. White
Editor
Canadian Metals & Metallurgical Industries

Ontario Chapter held an outstanding meeting on Nov. 6 at Toronto, with H. J. French, national president of the A.S.M., and W. H. Eisenman, national secretary, in attendance.

Chairman J. F. Thomlinson presided at the meeting, with the assistance of D. M. Fraser of Peerless Engineering Co. as technical chairman.

Mr. French, of International Nickel Co., Inc., and now senior technical consultant in charge of Metallurgical and Specification Section, Iron and Steel Branch, War Production Board, spoke on "The Selection of Alternate Materials".

Devoting much of his address to the question of NE steels, Mr. French dealt briefly with the principal steps taken in making adjustment to raw material shortages.

In a brief address Mr. Eisenman referred to the importance of the Chapter in the development and growth in power of the Society. Referring to the Congress and Exposition, Mr. Eisenman described it as entirely different with all activity directed toward contributing to the winning of the war.

This occasion represented a great mobilization of engineering talent and aided in demonstrating the importance of the Society as a factor in the welfare of the country in its time of need.

A record-breaking set of brake drums installed on a Chicago bus was in continuous service for four years, during which the bus traveled 276,103 miles. The drums were made of a wear and heat resisting molybdenum-vanadium cast iron.

Gill Talks on Tool Steels

Reported by Howard E. Boyer
Metallurgist, American Bosch Corp.

Springfield Chapter—The second meeting of the season, held at the Mansion House in Greenfield, Mass. on Nov. 16, brought a good turnout for dinner and quite a few more to attend the lecture.

This was on "Tool Steels" and was given by James P. Gill, chief metallurgist of the Vanadium-Alloys Steel Co. Much interest was shown in the lecture, as evidenced not only by the attendance but by the question period that followed.

Photo-Elastic & Fatigue Tests Study Design

Reported by A. J. Kleiner
Foreman, Hamilton Watch Co.

York Chapter—Members of the outlying districts of the Chapter journeyed to Waynesboro on Oct. 21 in the heart of the apple country for the annual meeting in that city. The local boys had a grand banquet and special refreshments in the form of apples and fresh cider following the lecture.

Dr. O. J. Horger of the Timken Roller Bearing Co. provided the academic portion of the meeting in the form of a splendid lecture, very well illustrated with slides and movies, on "Fatigue Analysis and Photo-Elastic Studies".

Fatigue failures of machine and structural members were discussed and supplemented with an outline of testing methods for determining means for obtaining increased fatigue strength by changes in shape, material, heat treatment, and surface treatments.

Size and Weight Reduced

Size and weight of parts may often be reduced with safety when it is understood how the applied load will cause a member to be stressed so that the points of greatest stress concentration may be reduced.

With the present limitations existing on the availability of material and processing facilities, many replacement parts must be made from substitute materials. The same may be said of new parts, so that it is necessary to have a knowledge of the fatigue characteristics of actual design members if breakdowns in production and service are to be minimized.

The process was discussed by which photographs of stresses in design members may be obtained through photo-elastic investigations. Plastic models of various design parts were used in conjunction with a projection lantern equipped with polarizing plates to demonstrate stress patterns on the screen.

Such studies showed how redesign could greatly reduce local stress concentrations which cause failure and thereby increase the life of the part. Moving pictures were also shown to indicate stresses under dynamic loading.

Specimen Size Important

It was explained how photo-elastic studies give information on the strength of a member resulting from its shape only; fatigue tests must be made to determine the influence of materials, heat treatment and size.

Fatigue strength values were presented for large specimens to indicate their much lower endurance strength as compared with the conventional small specimens. For this reason reliable endurance data cannot be obtained for use in the design of large members from tests made on scale-size models.

The fatigue properties of various steels and heat treatments were discussed, showing the lack of correlation between tensile strength and fatigue characteristics of design members. Ample fillets must be used in order to obtain the inherently higher fatigue strength of alloy steels as compared with plain carbon steels.

Dr. Horger showed the practical application of both photo-elastic studies and fatigue tests in connection with actual mechanical and metallurgical problems arising in the design of various kinds of machinery and mechanical equipment.

Address Correction!

Armand Di Giulio, secretary-treasurer of the Detroit Chapter A.S.M., reports that he is still receiving A.S.M. mail addressed to the University of Detroit. His present connection is with Bundy Tubing Co., and his mailing address is 15831 Hartwell Ave., Detroit.

Texas Applauds A. S. M. Movie on "Metal Crystals"

The moving picture film entitled "Metal Crystals" sponsored by the American Society for Metals met with an enthusiastic reception recently when presented to the Texas Chapter of the Society.

"This picture was extremely well received", said Charles H. Shapiro, technical chairman of the Program Committee of the Texas Chapter—one of the first A.S.M. groups to view the film.

C. H. Shapiro

"After its showing many, many opinions were expressed as to its quality from the viewpoint of photography, presentation and its educational value", Mr. Shapiro continued. "Such pictures are a credit to the Society and I would like to add my name to others who have no doubt expressed a desire for more pictures of this type on metal subjects."

While in possession of the Texas Chapter, the film was also shown to the metallurgical and mechanical engineering students of Texas A. & M. College, to the Metallurgical Defense Class sponsored by the College, and to the Houston Defense Class in Metallurgy sponsored by University of Texas.

This film was prepared by the Subcommittee on Visual Education of the A.S.M. Educational Committee in cooperation with the Ohio State University Research Foundation.

The first of a series of films on metallic subjects, this one on "Metal Crystals" defines and illustrates crystalline substances and shows graphically atom arrangements, space lattices, and the solidification mechanism.

Microscopic technique is demonstrated and temperature of solidification and cooling characteristics studied. Much use is made of animated drawings, graphs and arrows in the presentation.

This movie is a 900-ft. 16-mm., silent black and white film. It is available to any A.S.M. chapters desiring to show it at meetings.

Rubber Shortage Analyzed; Scrap Is Chief Source

Reported by E. J. Wellauer
Metallurgist, The Falk Corp.

Milwaukee Chapter—America's much discussed rubber shortage was analyzed by Dr. H. H. Harkins of Providence, R. I., assistant director of laboratories for the United States Rubber Co., who spoke at the October 20th meeting.

"The most important thing to remember now is that scrap rubber is our most important source of rubber for the immediate future", Dr. Harkins said. "If the United States is to have even a portion of its badly needed supply, it must come largely through reclaimed rubber.

Experiments in synthetic rubber are progressing rapidly, Dr. Harkins stated, but even if every synthetic rubber factory now under construction were to be completed as per schedule, it would be 1944 before our synthetic rubber producing capacity will be adequate for our needs.

Discussing the possibility of South America replacing the lost markets of Malaya and Sumatra, Dr. Harkins pointed out that it would take about 12 years to produce all the rubber we need down there even if that region had an adequate labor supply.

The United States Government is experimenting with Guayule rubber plantations in lower California, Arizona and Texas, but it is not expected that any of these plantations will produce enough rubber to ease the present critical shortage.

V 15 1 10
DEC 42
XUM

Engineering Uses Claim Plastic Output

Reported by Charles Nagler
Metallurgist, Tool Steel Division
Twin Cities Ordnance Plant
Federal Cartridge Corp.

North West Chapter—"Modern plastics can no longer be considered a novelty or gadget material for the production of nothing but ash-trays, tumblers, and electric razor housings". W. B. Longacre, technical representative of the Bakelite Corp. in Chicago, told the Chapter at the November meeting.

"Plastic materials are engineering materials", he said. "In no way will these materials replace metals, but will supplement the application of metals. The plastic industry still thinks in terms of pounds while the metal industry thinks in tons."

The history of modern plastics dates back to the year 1907 when Dr. Leo H. Bakeland produced the first synthetic plastic.

New Materials Added Daily

There is a variety of plastics on the market at the present time, of the phenol formaldehyde, urea formaldehyde, polystyrene, methylmethacrylate, vinyl, cellulose acetate, ethyl cellulose and acetobutyrate types. This list is not complete and every day there are new developments in the plastic raw material industry.

Mr. Longacre described the two types of plastics, thermosetting and thermoplastic, and demonstrated the shock resistance properties of various plastic materials.

On the speaker's table were numerous different examples of the application of plastics which had been engineered for definite industrial uses. One was the use of phenolic resins for the coating of fabric, and a description was given of a vinyl resin which is today being used for waterproofing the Army raincoat.

The oil soluble phenolic resin was described in its application to the paint and varnish industries where unusual protective coatings are required to prevent erosion and corrosion.

Glues for Plywood

A goodly amount of both phenolic and urea resin materials are finding their way into the laminated plywood field. A sample of a wing rib was shown on which both phenolic and urea glues were used.

Other bonding resins are used for high speed abrasive wheels for cutting hard alloys.

It was pointed out that without the use of phenolic resin molding compounds, the modern communication systems would not be workable.

Other applications of plastics that were shown were washing machine parts, milking machine parts, timing gears, oil well driller noses, flight computers, and bottle caps.

After the discussion, the meeting was thrown open to questions and when the meeting was adjourned, considerable time was spent in examining the assortment of samples on the speaker's table.

Says Selection of Heat Resisting Alloys Varies

(Continued from page 1)

particularly adapted. The effect of minor constituents, including carbon, manganese, silicon and aluminum, was outlined.

Foundry practice on heat resisting alloys must take into consideration high solidification volume shrinkage. This necessitates revision for unusual gating and risering and the avoidance of rapid sectional changes.

In design of heat resisting units stresses set up by temperature fluctuation are more responsible for failures than all other causes combined. Allowance must be made for dimensional variations which are many times as great as those encountered in ordinary structural engineering.

Worcester Speaker

Charles M. Parker (Left), Secretary of the General Technical Committee of the American Iron and Steel Institute, Spoke Before the Worcester Chapter on Nov. 11 on the Vital Subject of "National Emergency Steels". George H. Campbell (right) acted as technical chairman and introduced Mr. Parker.

Talks on Special Deoxidation Open Chicago Seminar

(Continued from page 1)

Kinzel elaborated this conception as follows:

Starting with a manganese-free carbon steel of hardenability of 0.2 in. diameter, addition of 0.3% of either manganese or molybdenum will double the hardenability; 0.6% of either one will triple it. However, by adding only 0.3% of Mn plus 0.3% of Mo, we get a hardenability factor of $2 \times 2 = 4$. It is this difference between 0.6% total alloy as one or two alloys which is the "something for nothing".

Dr. Kinzel, who is also senior consultant to WPB, stated that molybdenum is the most critical of the alloying elements, and that manganese is the least.

Tisdale Discusses Boron

Mr. Tisdale then discussed boron as an addition to steel. Some of the original work on boron in cast iron was done by Japanese investigators. However, when their directions in the literature were followed, very poor results were obtained, and when the opposite was done, results were much better.

About 0.003% is the best percentage of boron for steel. Mr. Tisdale also pointed out the importance of correct analysis of the boron in the steel, and stated that his company, in conjunction with Youngstown Sheet & Tube Co., has just worked out two new chemical methods and one spectrographic method.

The last speaker, Mr. Kaye, gave a resume of the development of the special methods of steel deoxidation. A committee of the American Iron and Steel Institute is just finishing a comprehensive study of the entire subject.

The discussion which followed the speeches covered a full range of topics. Mr. Strauss stated that "hardenability intensifier" is a better term than deoxidizer, since the mechanism of the effects of the additions is not completely understood. It was also brought out that better workability is obtained in the normalized state by the use of a hardenability intensifier than by a high alloy content.

The discussion was finally halted by the fact that the building had to be closed for the night. It was an interesting and significant fact that the audience of 100 included several women.

History of Artillery Given

Reported by John E. Erb
General Electric Co.

Schenectady Chapter held its monthly meeting on Tuesday evening, Nov. 24, at the Circle Inn near Troy, N. Y. Colonel D. L. Hine, works manager of the Watervliet Arsenal, delivered a talk on the history of artillery.

NE 9400 May Dominate Field McQuaid Believes

(Continued from page 1)

Critical materials have made it necessary to eliminate several of the initially proposed types of NE steels, and just what will be the final decision as to which type, or types, shall be manufactured remains to be seen.

Sees Future for SAE T-1300

According to Mr. McQuaid, the well-known SAE T-1300 series is one of the best in the country, but many of the other low alloy SAE steels will be discarded permanently, even after the present disturbance is over. Those discarded will be replaced by the NE steels developed originally as substitutes, but found to be of greater value both from an economic, as well as metallurgical standpoint.

In other words, we have everything to gain, and little to lose, by substitution, and fears along this line should be dispelled. Such was the theme of Mr. McQuaid's talk.

Possibly anticipating questions on how the new NE steels will be evaluated, the speaker devoted the balance of his talk to metallurgical principles and the need of proper heat treatment. The Jominy test for hardenability and Grossmann's monumental work on "ideal size" and calculation of hardenability were discussed in great detail, and shown to be a "must" in the consideration of testing new steels.

Antidotes to Hysteria

Alloys have often been used in too great quantities in the past, according to Mr. McQuaid, where proper quenching practice would produce desired hardenability. Consideration of stress concentrations and application of sound metallurgical principles are the antidotes to any hysteria occasioned by substitution.

An old friend of the Chapter, Ralph C. Bevan, general agent for the National Life Insurance Co. of Vermont, was the coffee speaker at the dinner preceding the meeting. The title of his talk was "The Lighter Side of Life Insurance", which turned out to be some of the best stories heard in these parts for the last 20 years or more.

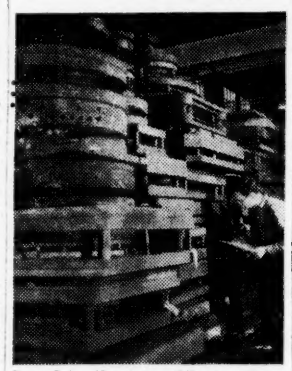
Stagg's Tool Steel Talk Holds Audience Over

Reported by W. E. Ellsworth
District Manager, Claud S. Gordon Co.

Indianapolis Chapter—Howard J. Stagg of Crucible Steel Co. of America was the speaker at the regular meeting on Nov. 16 held at the Washington Hotel. His talk on "Tool Steels, Their Selection and Heat Treatment" was reviewed in considerable detail in the November issue of THE REVIEW.

Sixty-eight members were present at the dinner and approximately 90 attended the technical session. The interest of the audience was indicated by the fact that the general discussion after the talk was continued considerably past the usual closing hour.

Steel Dies Scrapped



Bound for the Scrap Pile Are These Obsolete Dies, at the East Pittsburgh Works of Westinghouse Electric & Mfg. Co. More than 2000 dies and jigs have been released from storage by Westinghouse to feed scrap-hungry open-hearths. Valuable tool steel in the die faces is being salvaged for re-use.

Three Talks on Al in 2nd Educational Series

Reported by R. L. Rickett
U. S. Steel Corp. Research Laboratory

New Jersey Chapter—The second series of educational lectures offered this year was on "Aluminum and Its Alloys". The series consisted of three lectures, all given by R. M. Phillips, metallurgist at the Edgewater, N. J., plant of the Aluminum Co. of America.

These lectures were planned to meet the growing need for technical information on the production, alloys, heat treatment and fabrication of aluminum in these days when more and more thousands of aircraft are being made.

Three motion picture films provided by the Aluminum Co. of America were used to supplement the talks; these described the machining, welding and riveting of aluminum and its alloys.

Messerschmitt Travels to Phila. Viewed by 1200

(Continued from page 1)

positions of the alloys used in the various parts. Many of these alloys were quite different from standard American practice and their number was so varied that there seemed to be little effort toward standardization.

At the time this engine was made, which was probably early in 1939, Germany obviously had no manpower problem judging by the amount of tedious hand polishing done on such parts as castings. Neither were they apparently troubled with a shortage of alloys, in many instances using rich "mixes" for parts subjected to very low stresses where plain carbon or low alloy compositions were sufficient.

Educators Speak at Dinner

However, the impression left on most of the audience was that German engine manufacture was not inferior, but compared favorably with ours.

At the dinner preceding the meeting Dr. Johnson, president of Temple University, addressed the group and extended a cordial welcome to the A.S.M. on behalf of the University.

Another noted educator, President Rea of Drexel Institute of Technology, was the coffee speaker. He discussed briefly the problem of young college men facing the decision of continuing the pursuit of their education or enlisting in the armed forces.

A highlight of the evening was the awarding of a scroll to Horace C. Knerr on behalf of his fellow members of the Philadelphia Chapter. The presentation was made by Chairman Frank Tatnall in appreciation of Mr. Knerr's 20 years' service as head of the Chapter-sponsored metallurgy course at Temple.

Two Speakers Discuss Theory Of Induction Heat, Equipment Design

Reported by H. E. Hostetter
Metallurgical Engineer
Climax Molybdenum Co.

St. Louis Chapter—J. W. Cable and L. T. Schakenback of the Induction Heating Corp., New York, shared honors at the November meeting speaking on the subject, "Hardening and Joining of Metals by Induction Heating".

Mr. Cable discussed the electrical theory of induction heating, while Mr. Shackenback followed with a description of the design and application of equipment for specific uses.

Induction heating is produced by inducing an alternating current in the body to be heated. In magnetic materials this current flow is accompanied by two heat-producing losses: *(a)* Hysteresis losses, and *(b)* eddy current losses.

Hysteresis losses are due to the reversal of the magnetic field by the alternating current, and hence are proportional to the frequency and strength of the magnetic field.

High Frequencies Used

Eddy current losses are due to the electrical resistance of the material in which the induced current flows; the eddy current losses are proportional to the square of the current flowing and the resistance of the material. Obviously, when nonmagnetic materials such as austenite, brasses and aluminum are induction heated, eddy currents alone play a role.

Successful induction heating requires that the rate at which heat is generated within the work piece exceed the rate at which heat is lost by conduction, radiation and convection. Since both the hysteresis and eddy current losses increase with increase in the current frequency, induction heating utilizes high frequencies of 1,000 to 500,000 cycles per second.

The sources of high frequency electrical energy used for induction heating are the rotating electrical generator, the resonant spark gap circuit and the vacuum tube oscillator. Each source has certain advantages and limitations.

Design and specification of equipment for induction heating makes chief use of manipulation of the following factors to accomplish the desired result: *(a)* Frequency, *(b)* power input, *(c)* type of inductor coil (single or multiple turn), *(d)* coil shape, *(e)* spacing between coil and work.

Coils Placed Inside Cylinders

It has been found in the brazing of copper fins on the outside of steel cylinders that when the inductor coil is placed outside the cylinder, the copper fins expand rapidly and lose contact with the cylinder. The solution lies in an inductor coil placed inside the steel cylinder; the steel is heated first, and then by conduction, the brazing alloy and copper are heated.

Other examples discussed were the brazing of steel tubes on a steel casting, the brazing of propeller edges, hardening the cutting edges of pliers, the localized hardening of 37-mm. shot caps, and the hardening of laminations in ammeters.

In the discussion that followed the formal talk C. B. Swander, Wagner Electric Corp.'s chief metallurgist, paid particular tribute to the ease of control and the speed of induction hardening in the manufacture of certain ordnance items.

N. J. WPAC Aids 75 Firms

New Jersey Chapter's War Products Advisory Committee in the first nine months of its service has assisted 75 shops in and around Newark to solve pressing metallurgical and production problems, according to Norman E. Woldman, chairman of the committee.

Guiding a Chapter Through a Time of War

By John W. Queen, Jr.
Chairman, New Jersey Chapter

When our genial secretary asked me to give a talk before this group on "Guiding a Chapter Through a Time of War", I tried to figure out why he had asked the New Jersey Chapter to handle *this* subject. I didn't think the New Jersey men were any more belligerent than other metallurgists!

I recalled that we are only fifth in membership standing, so it can't be that. Then, I remembered that the New Jersey Chapter *does* have more sustaining members than any other chapter in the National Society. Although this is proof that industry in our section is squarely behind our activities, it surely could not be the entire reason for the selection.

Our national secretary *had* said that "The war situation presents problems which your chapter and other chapters have to meet, and the New Jersey Chapter has done a mighty fine job in meeting them." Well, we frankly felt that we had done no more than any other chapter, but let us take stock and see what has been accomplished.

If there is any time when a chapter's usefulness should be demonstrated, it is in time of war. Therefore, the major problem presented by the war is to make our chapter a vital force—and a real part in the war effort.

If the New Jersey Chapter can rightfully lay claim to any distinction, I hope it is based upon our ability to keep attuned to the times. When the supreme objective of the entire country is to win the war, it seems clear to me that a chapter's usefulness, and its right to carry on, is measured directly by its adaptability to war conditions—its directness of purpose in "helping to win the war."

Early in the summer of 1941, when we were beginning to feel the pinch on tungsten for high speed steel, my predecessor as chairman responded to an article in THE REVIEW requesting the local chapters to hold meetings as soon as possible on the use of molybdenum high speed steels in place of the conventional tungsten types.

He immediately called a special summer meeting on the method of handling and heat treating the moly types of high speed steels, selecting a qualified and nationally known speaker for the subject. This showed, among other things, that the chairman of a chapter must have the courage of his convictions, since only a man of the greatest courage would call a meeting of Jerseyites in the middle of Newark's sweltering August.

And right here, I would like to digress and point out that quick action in calling special meetings can only be accomplished successfully if the chapter is organized in a truly substantial way. In a chapter that is substantially organized, you will find its executive committee made up of well-qualified men eager to contribute their efforts to the chapter activities.

The chapter will be financially sound and will have the backing of all industries it serves. The New Jersey Chapter is young—only 12 years old—but it has been fortunate in electing men to its executive committee who believe in the Society's work and who are willing to contribute their time and effort to its activities.

We are also fortunate to be in an area that has diversity, from the heavy manufacturers down to manufacturers of precision instruments. We have sold these industries on the benefits that they can obtain by having their employees actively participating in our affairs.

Proof of this is that we have the largest number of sustaining members of any chapter in the national organization. Today, we have 78 sustaining members. The Ontario Chapter is running a close second.

So, a chapter that is well organized and set up ready to go has no trouble in wartime putting on a special meeting with very short notice. Each member of the committee has his special assignments, all the way from making arrangements for the meeting room to issuing the notices, the bulletins and the publicity. Perhaps you might be interested in the committees which we have set up and how they operate.

The Program Committee

Even in peacetime the program committee sends out a questionnaire to all members, giving each member a chance to suggest his topic for a meeting, or suggest his favorite speaker. In wartime, with its countless new problems and a sharp revision of interests in many cases, this practice becomes doubly important.

A list of possible subjects is included on the questionnaire for each member to check, showing his preference. He is even given an opportunity to vote on pertinent questions which affect the running of the chapter.

The chairman of the program committee is generally a well-known personage who can approach and will approach nationally known speakers. Subjects vital to war industries are very numerous and our problem has been boiling them down from the members' votes to the most important ones. From this concentrated list are selected subjects that have not been given in this area recently, and those that are extremely new.

This year, as a special wartime precaution, we purposely left open our May meeting because we felt that before May some vitally important development might arise that should be the subject for a regular meeting. In this manner, we do not irrevocably close our program to some vital war subject.

Another thing—it is not always possible to secure speakers far in advance. In these days when everyone's time is taxed to the limit, commitments for future dates cannot be made absolute.

A good many men are serving on War Production Board Advisory Committees or in some other capacity where they are subject to call at any time. Sound policy is to have, whenever possible, a local speaker on tap who could pinch hit on a similar subject in case the scheduled speaker cannot come.

Last fall, for example, we were confronted with an awkward situation. Our scheduled speaker had not originally intended to fly in, but heavy appointments left him with the only option to come by plane. As luck would have it, bad weather caught him, and we were suddenly without a speaker four hours before meeting time.

Only with the help of 20 phone calls and a stroke of good fortune were we able to locate a substitute speaker to give our members an excellent talk on a subject closely allied to that originally scheduled. From this experience, we learned our lesson—we resolved never to be caught again in this predicament.

Arrangements Committee

The activities of the arrangements committee can have an important bearing on the success of a chapter. In these war times many members are so busy that little extra inducements may be necessary to assure their presence at the meetings. These somewhat subtle things—atmosphere, smartness of procedure, the quality and price of the dinner, must be made an integral part of the meetings by the arrangements committee.

Here are some of its functions: It is necessary to have a permanent home, such as a prominent hotel, and to have your meetings on a designated day of the month. We have ours on the third Monday of each month. In this way, the members will set aside that night each month. A pre-meeting dinner is arranged with a "coffee talker" on some light subject not necessarily connected with metals. This is held in a private dining room.

Projection equipment for lantern slides and movies should be provided by professional talent, thus insuring the speaker's confidence that his slides will be properly shown with the least amount of annoyance to him, and also to prevent damage to any films loaned.

In addition to the regular standing microphone, we supply a lapel microphone for the speaker so that even if his head is turned toward the screen, his voice is heard throughout the entire room.

He is also provided with an electric pointer. These little modern conveniences make the difference between an ordinary meeting and a first-class meeting.

At the end of each regular meeting, free refreshments are served, thus creating good fellowship by allowing those who so desire to linger and rehash their own particular war problem. We cannot over-estimate the value of this provision, for the opportunity for harassed metallurgists to discuss pressing war production problems is rare indeed, in these busy times.

Finances

You might ask, "Where do the funds come from to support all this enterprise?" The New Jersey Chapter is financially sound. Two main sources of revenue contribute to this. The first is the fact that we have a total membership of over 600, which includes 78 sustaining members.

The second is that all our bulletins and notices are printed and mailed out at no expense to us by carrying four advertisements on each bulletin, and eight or ten advertisements in the Year Book. We have yet to have a single objection from any member because his notice of the meeting bears an ad. Even our annual smoker in December has never shown a deficit.

And, speaking of wartime chapter affairs, we should mention, incidentally, that our assets include $5,000 worth of war bonds, and we already have plans underway to spend the interest from these bonds on a worthy war-effort cause.

Educational Committee

Our policy on educational activities necessitated a change because of the war. In the 1940-41 season, when the Defense Program was just starting, we ran an educational series entitled "An Introduction to Practical Metallurgy", given by one lecturer. An abstract of the four lectures was preprinted and mailed to each member of the chapter.

That season's educational activities proved an overwhelming success, partly because we were one of the first to revert to courses of an elementary nature, and partly because the schools and large industries had yet to start their own defense courses in metallurgy.

However, the following year we found that there were a great many defense courses being given, not only in vocational schools and engineering schools, but even in the large manufacturing plants. This cut into our educational course attendance tremendously. The competition was great even though our courses were offered absolutely free of charge.

To overcome this, our educational committee planned a series of four short educational courses of two or three lectures each, each series being given by one lecturer. The topics were to be specialized. In fact—and this is important—they were the type of course that could not be obtained in any school.

Each lecturer is required to submit for preprinting an abstract of his lecture. These are given to each man attending so he may review the course and retain what knowledge he might have acquired. The subjects of these streamlined courses are as follows:

1. Magnesium and its Alloys
2. Aluminum and its Alloys

3 & 4. Inspection Technique, Including the Microscope, Spectroscope and X-Ray Equipment.

We also have a committee on University Contact. This committee prepares and sends out with our monthly bulletins little flyers announcing courses in metals that are being given by the various engineering schools in this locality. This is of great assistance to the schools and also to our members.

Open Meeting Policy

Since the beginning of the war, we have developed a new policy in connection with our meetings. We are now opening our meetings to all other technical societies in this area. We are printing additional announcements of our meetings so that any society which we feel would be interested in a vital war-production subject can mail notices of these meetings to their membership.

For our special NE Steels summer meeting, which we held last July, at which we "jumped the gun" and obtained three top-notch men from the War Production Board to give us the true story on NE steels, we sent out over 7000 announcements of this meeting, inviting such societies as the A.S.M.E., S.A.E., A.S.T.E. and A.W.S.

We have found this policy is doing our chapter a world of good. It helps to place our War Products Advisory Committee before all these groups and to establish ourselves as an instrumental aid to the war effort in our community.

Radio Broadcasting

The New Jersey Chapter is now putting on a series of six broadcasts, on the subject of "Metals and the War". These broadcasts are given once a month for a 15-min. period. We have already given four of these.

This activity started when our secretary sent us a radio script to be used in announcing the formation of the War Products Advisory Committee. One of our committeemen approached Radio Station WAAT, which is an independent local station serving northern New Jersey. Odd as it may seem, he walked into this radio station without any contacts, and sold them the idea of putting on this first broadcast. They were so pleased with the idea that they told him that they would give us six 15-min. broadcasts, one a month.

Before each broadcast we send a postcard to each member of the chapter announcing the station, title of the broadcast and the hour. The station is more than pleased to have developed new listeners, and it all fits in with the station's drive to improve its "war effort" prestige in the community. In fact, they have gone so far as to offer us time in the morning when we can put on an educational broadcast which would be tuned in by the high schools and engineering schools and apprentice classes in the neighborhood.

Two of the scripts for our monthly "Metals and the War" broadcasts have been furnished by the Cleveland office, and two other scripts were written by the chairman of our publicity committee.

We now have a little competition under way in which any member of the chapter may submit a script. The best two scripts will be selected and that person will be given the opportunity of putting his broadcast on the air.

The purpose of these broadcasts is to keep the public at large metal-minded and at the same time give further publicity to our War Products Advisory Committee in an attempt to reach the small shops. Some of the broadcasts, too, are on special topics of immediate wartime urgency from the public's viewpoint.

Thus, one of our first broadcasts was on "salvage" and explained to the public the great need for scrap by the steel industry and what types of household metal scrap should be turned in.

Increased Enthusiasm Shown

During this war period there is not one of us who is not head-over-heels in work. However, oddly enough, there seems to be even more enthusiasm and more desire to pitch in by our members at large and by our executive committee in these troublesome times. No one seems to know where he finds the time to do this extra work.

Perhaps this plus effort stems from the inner satisfaction which all of us feel in trying to do our part in the great war effort of the grand old U.S.A.

All Out for Victory

I hope the review which I have given you in some measure establishes the New Jersey Chapter of the American Society for Metals as on the "alert"—and in gear with the war effort.

When history is written and Hitler and Hirohito have been buried under a mountain of metal munitions—all "Made in America"—we should make sure it can be then truthfully said that the American Society for Metals was a virile, dynamic force—throughout the entire struggle—and during the entire war-period we were attuned to the times.

The New Jersey Chapter joins with all of the other chapters in—"All out for Victory"!

Chapter & WPAC Chairmen's Breakfast

One of the early morning profitable and satisfactory meetings during the recent A.S.M. convention was the chapter and WPAC chairmen's breakfast in the Euclid Ballroom of Hotel Statler on Wednesday, Oct. 14.

The chairmen were guests of the Board of Trustees, all of whom were in attendance.

President Stoughton introduced John W. Queen, Jr., chairman of New Jersey Chapter, who presented an interesting paper on the activities of a chapter during war. This paper is printed in full on this page.

President Stoughton then introduced H. L. Geiger, who told of the formation and activities of the Chicago War Products Advisory Committee, outlining the work that it had done and hopes to carry out.

After these two papers a number of the chairmen presented experiences they felt would be helpful to the entire group.

The meeting adjourned at nine o'clock in order that all the members might attend the annual meeting of the American Society for Metals.

V 15 - 10
DEC
42
XUM

ASM-WAR PRODUCTS ADVISORY COMMITTEES

WAR PRODUCTS ADVISORY COMMITTEES have been organized by the local chapters of the American Society for Metals as a *free* advisory service for the metal producing and metal working industries. These ASM-War Products Advisory Committees meet regularly. Every manufacturer of war products is invited to avail himself of these meetings.

If you have a problem, do not hesitate to get in touch with your local committee. Write or phone the coordinator, chairman, secretary or problem recorder as indicated in the list of committees on this page. Complete personnel of the committees has been published in previous issues of THE REVIEW.

The work of the ASM-War Products Advisory Committees is solely a contribution to present war-time efforts. You need not be a member of the American Society for Metals to obtain this service. *You will not be solicited for membership.* This is a sincere effort on the part of the chapters of the ASM to make a valuable contribution to "Ultimate Victory".

Baltimore ASM-WPAC

R. E. Vining, *Coordinator*
P. O. Box 2075, Baltimore, Md.
Gilmor 0222

★ ★ ★

Boston ASM-WPAC

George H. Burnett
Chapter Chairman
% Hartel Bros. Co.
85 W. First St.
South Boston, Mass.
SOU 2603

★ ★ ★

British Columbia ASM-WPAC

F. A. Forward, *Chapter Chairman*
University of British Columbia
Vancouver, B. C.

★ ★ ★

Calumet ASM-WPAC

C. E. Chapman, *Chairman*
773 Johnson St.
Gary, Ind.

H. H. Feierbend, *Problem Recorder*
Northern Indiana Public Service Co.
Hammond, Ind.
Hammond 5200

★ ★ ★

Canton-Massillon ASM-WPAC

E. S. Rowland, *Coordinator*,
Timken Steel & Tube Co.

L. A. Zeitz, *Secretary*
East Ohio Gas Co., Canton, Ohio
Dial 5151

★ ★ ★

Chicago ASM-WPAC

George A. Spencer, *Chairman*
Crown Rheostat & Supply Co.

Harold L. Geiger, *Coordinator*
International Nickel Co.
Room 1212, 333 N. Michigan Ave.
Chicago, Ill.
FRanklin 4030

★ ★ ★

Cincinnati ASM-WPAC

Stanton T. Olinger, *Chairman*
Industrial Gas Division
Cincinnati Gas & Electric Co.
4th and Main St., Cincinnati, Ohio
Main 2000

O. Wilhelmy, *Vice-Chairman*
Electrical Division
Cincinnati Gas & Electric Co.

Cleveland ASM-WPAC

William C. Stewart
General Chairman
American Institute of Bolt, Nut & Rivet Manufacturers
Room 1550 Hanna Building
Cleveland, Ohio
Cherry 4112

★ ★ ★

Columbus ASM-WPAC

J. W. Barnet, *Chairman*
Battelle Memorial Institute
Columbus, Ohio
University 4193

★ ★ ★

Dayton ASM-WPAC

S. R. Prance, *Chairman*
Inland Mfg. Div.
General Motors Corp.

I. J. Rapp, *Secretary*
Dayton Power & Light Co.
Dayton, Ohio—Fulton 3141

★ ★ ★

Detroit ASM-WPAC

E. H. Stilwill, *Chairman*
Dodge Bros. Div., Chrysler Corp.
Tr 2-6100

★ ★ ★

Georgia ASM-WPAC

J. R. Whitehurst, *Chairman*
Medley Mfg. Co.
Columbus, Ga.

★ ★ ★

Golden Gate ASM-WPAC

S. H. Edwards, *Chairman*
Industrial Steel Treating Co.
Oakland, Calif.

G. A. Nelson
Secretary and Coordinator
2842 Parker St., Berkeley, Calif.
Berkeley 2906W

Hartford ASM-WPAC

D. A. Nemser, *Chairman*
Room 610, 75 Pearl St.
Hartford, Conn.
Hartford 7-0383

★ ★ ★

Indianapolis ASM-WPAC

Arthur E. Focke, *Coordinator*
Diamond Chain & Mfg. Co.
Indianapolis, Ind.
Riley 9311

★ ★ ★

Lehigh Valley ASM-WPAC

J. W. Foster, *Coordinator*
Metallurgical Department
Ingersoll-Rand Co.
Phillipsburg, N. J.
Phone 5-2121

Robert D. Stout, *Secretary*
Lehigh University
Bethlehem, Pa.
Phone 6-5012

★ ★ ★

Los Angeles ASM-WPAC

W. J. Parsons, *Coordinator*
Pacific Scientific Co.
1430 Grande Vista Ave.
Los Angeles, Calif.
Angeles 2-1123

★ ★ ★

Milwaukee ASM-WPAC

M. A. Scheil, *Chairman*
A. O. Smith Corp.

B. G. Guenther, *Secretary*
Wisconsin Motor Corp.

Irvin J. Ott, *Problem Recorder*
Milwaukee Association of Commerce
611 N. Broadway—Room 511
Milwaukee, Wis.
Daly 2935

★ ★ ★

New Jersey ASM-WPAC

N. E. Woldman, *Chairman*
Bendix Aviation Corp.
Bendix, N. J.
Hasbrouck Heights 8-2000
Mailing Address
P.O. Box No. 11
Harrison, N. J.

★ ★ ★

New Haven ASM-WPAC

P. H. Tomlinson
Ansonia Area Problem Recorder
Farrel-Birmingham Co., Inc.
Ansonia 3600

J. C. Huston
Bridgeport Area Problem Recorder
Bridgeport Gas Light Co.
Bridgeport 3-3161

C. E. Littell
New Haven Area Problem Recorder
Koppers Conn. Coke Co.
New Haven 4-1681

Roy E. Peterson
Norwalk Area Problem Recorder
The E. H. Hotchkiss Co.
Norwalk 6-1664

Robert C. LeMay
Waterbury Area Problem Recorder
Connecticut Light & Power Co.
Waterbury 3-0131

New York ASM-WPAC

Robert G. Humphrey
District Coordinator
Technical Staff
Bell Telephone Laboratories

W. C. Mearns, *Chairman*
International Nickel Co.
67 Wall St., New York City
Whitehall 4-1000

★ ★ ★

North West ASM-WPAC

Alexis Caswell, *Coordinator*
200 Builders Exchange Bldg.
Minneapolis, Minn.
ATlantic 6401

★ ★ ★

Northwestern Pennsylvania ASM-WPAC

John P. Beal, Jr., *Chairman*
Universal-Cyclops Steel Corp.
Titusville 243

★ ★ ★

Oregon ASM-WPAC

Norton L. Peck, *Chairman*
303 N. W. Park Ave., Portland, Ore.
BR. 0695

★ ★ ★

Peoria ASM-WPAC

Glenn G. Thiersch, *Coordinator*
213 South Jefferson St., Peoria, Ill.
Peoria 6197

★ ★ ★

Philadelphia ASM-WPAC

Joseph Sharpe, *Chairman*
Sharpe & Flynn, Inc.
Stokely Ave. above Roberts Ave.
Philadelphia, Pa.—Dav. 5200

★ ★ ★

Pittsburgh ASM-WPAC

H. V. Beasley, *Chairman*
International Nickel Co.
Grant Bldg., Pittsburgh
Grant 9893

T. W. Merrill *Vice-Chairman*
Vanadium Corp. of America
Bridgeville, Pa.
Walnut 4405

★ ★ ★

Puget Sound ASM-WPAC

W. R. Case, *Coordinator*
Seattle Steel Co.
1200 Fourth Ave., South
Seattle, Wash
Se 2300

Joseph Daniels
Assistant Coordinator
Professor of Mining and Metallurgy
University of Washington
Seattle, Wash.
Me 0630

Rockford ASM-WPAC

J. N. Harris, *General Chairman*
Rockford Drop Forge Co.
Rockford, Ill.
Phone M 188

L. R. Foote, *Coordinator*
Room 311, Gas & Electric Bldg.
Rockford, Ill.
Phone M 6900

★ ★ ★

Schenectady ASM-WPAC

L. L. Wyman, *Coordinator*

Mrs. C. B. Brodie, *Secretary*
Research Laboratory
General Electric Co.
Schenectady, N. Y.
Schenectady 4-2211
Ext. 3827 or Ext. 4295

★ ★ ★

Southern ASM-WPAC

F. W. Hanson, *Chairman*
Electro Metallurgical Corp.
Birmingham, Ala.
Phone 3-6164

★ ★ ★

Springfield ASM-WPAC

C. H. Stonerod, *Chairman*
Box 665, Springfield, Mass.
Phone 4-6222

★ ★ ★

St. Louis ASM-WPAC

George Moeller, *Coordinator*
Dazey Churn Mfg. Co.
4301 Warne Ave., St. Louis, Mo.
GOodfellow 6300

★ ★ ★

Syracuse ASM-WPAC

C. T. Patterson, *Coordinator*
Solvay Process Co.

J. R. MacAllister, *Recorder*
War Production Board
Starrett-Syracuse Bldg.
Syracuse, N. Y.
Syracuse 3-9184

★ ★ ★

Texas ASM-WPAC

L. M. Cole, *Coordinating Chairman*
Warner & Swasey Sales Co.
409 Velasco St., Houston, Texas
Capital 5580

★ ★ ★

Toledo Group ASM-WPAC

Charles C. Eeles, *Coordinator*
Ohio Fuel Gas Co.
231 Huron St., Toledo, Ohio
Adams 9101

★ ★ ★

Tri-City ASM-WPAC

H. N. Bristow, *Chairman*
Deere & Mansur Works
Moline, Ill.
Moline 3400

★ ★ ★

Worcester ASM-WPAC

Chester M. Inman, *Chairman*
Pratt & Inman
Worcester, Mass.
Phone 5-4383

★ ★ ★

York ASM-WPAC

G. J. O'Neill, *Chairman*
Pennsylvania Gas & Electric Co.
York, Pa.
Phone 6887

HERE'S YOUR HANDBOOK ON HARDNESS TESTING

Hardness and Hardness Measurements

By S. R. WILLIAMS

Professor of Physics, Amherst College

Twenty-five years of study and experience in every phase of hardness and hardness testing have been packed into this 558-page book by Prof. Williams.

Here is the comprehensive, profusely illustrated reference book you have always wanted—a book that will be your "bible" when it comes to any type of hardness problem—a book with so much information you will want it by you as a constant guide in your work.

HARDNESS AND HARDNESS MEASUREMENTS

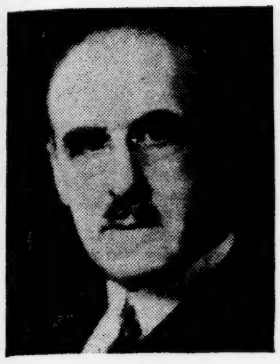
558 PAGES • 339 ILLUSTRATIONS • 6" x 9"
CLOTH BINDING

Price $7.50 — Published by

AMERICAN SOCIETY FOR METALS
7301 EUCLID AVENUE, CLEVELAND, OHIO

F. M. Becket Dies, Was Pioneer in Electrometallurgy

The death of FREDERICK MARK BECKET, 67, consultant to Union Carbide and Carbon Corp., on Dec. 1 at Roosevelt Hospital, New York, brings to a close the remarkable career of a foremost pioneer in the field of electrometallurgy.



F. M. Becket

Originator of the fundamental process of producing low carbon ferro-alloys in the electric furnace by means of silicon, Dr. Becket early applied this method to production of vanadium, molybdenum, chromium, and manganese.

As a former president of Union Carbide and Carbon Research Laboratories, and as vice-president of Union Carbide Co., Electro Metallurgical Co., and Haynes Stellite Co., Dr. Becket was also responsible for much important research work on the vanadium and molybdenum engineering steels and the high chromium and stainless steels.

Numerous honors which have paid tribute to Dr. Becket's work include the Perkin Medal of the associated chemical and electrochemical societies; the Acheson Medal, honorary membership, and the presidency of the Electrochemical Society; the Elliott Cresson Medal of the Franklin Institute; and the Modern Pioneers Award of the National Association of Manufacturers.

He served as president of the A.I.M.E. in 1933 and of the Chemists' Club in 1939, and has received honorary degrees from Columbia and McGill University.

METAL PROGRESS's "Biographical Dictionary of Eminent Living Metallurgists" carried an intimate account of his life and accomplishments in September 1935.

Harold W. Fletcher

HAROLD W. FLETCHER, 51, long-time vice-president and general manager of the Hughes Tool Co., died in Houston, Texas, Oct. 14.

Outstanding in oil country activities, Mr. Fletcher was graduated from Cornell University in 1915 with a mechanical engineering degree. After one year with Rock Tunneling Machine Corp., he joined Hughes Tool Co. and was successively engineer, chief engineer, and currently vice-president and general manager.

Mr. Fletcher was active in American Petroleum Institute standardization work, and was likewise a member of the A.S.M., A.S.M.E., A.I.M.E., and Sigma Xi.

Walter C. Ware

Following an illness of several weeks preceded by a heart attack, WALTER C. WARE of the Paragon Gear Co., Taunton, Mass., died Oct. 22.

Although not a graduate of any technical school, Mr. Ware was a natural mechanic. He learned the pattern maker's trade and made a thorough study of how parts of various pieces of machinery are designed, cast and assembled.

In the early 1900's he became associated with Fay & Bowen of Auburn and Geneva, N. Y., where he rose to be president. In 1927 he joined the Paragon Gear Co. in Taunton and has been active in engineering and sales.

Steel Forgings For War Use Timely Topic

Reported by S. A. Stafford
Metallurgist, Vulcan Crucible Steel Co.

Pittsburgh Chapter—"Steel Forgings", a topic of timely interest in these war production days, was the subject at the Oct. 8th meeting. Francis B. Foley, superintendent of research, The Midvale Co., and consultant to the War Production Board, was the speaker.

Mr. Foley's talk, enlightened by a series of interesting slides, dwelt on the problems encountered and overcome in the making of forging steels, and their fabrication into huge gun, turbine rotor, roll and container forgings.

Years of experience have made standard the use of vanadium in these forgings, not so much as an alloying element but to refine the grain, to control inclusions, and to obtain the ductility that is required.

Inclusions are affected to a considerable extent by the rate of cooling and increase rapidly in size as the ingot size increases and the cooling rate falls. This causes a problem in huge forgings, some of which are made from 108-in. ingots.

The centers of these forgings are frequently bored for macroscopic examination for soundness.

Discussing flakes and cooling cracks, he outlined an hypothesis ascribing flakes to the overheating of areas of highly concentrated segregates to the point of liquefaction.

Cooling cracks are cracks in the metal that nearly always follow ferritic or crystalline boundaries in the austenitic condition, and are almost always associated with coarse crystal structures. Slow cooling after forging will usually prevent the formation of cooling cracks.

Mr. Foley pointed out that, because of the harmful effect of unequal stresses, turbine rotors, which run up to 100 tons, are never liquid quenched. Dependence is placed rather on alloying elements to obtain the proper physical properties.

Remarking on the scale losses on some of these forgings, he spoke of some special instances where additional reheatings were required and the scale loss was great enough that the forgings had to be rejected on account of loss in size.

A lively discussion followed the talk, after which a snappy session was held over beer and pretzels—with and without inclusions, but with plenty of cooling cracks.

Three Sound Films Give Basic Training To Aluminum Workers

By Lyne S. Metcalfe

As a contribution to the war production effort, in the job of giving basic training to new workers in aluminum, three sound motion pictures have been made available by the Aluminum Co. of America, produced by the Jam Handy Organization, Detroit.

The first production, "How to Weld Aluminum", has a running time of 36 min. It shows how to accomplish the various essentials of torch and arc welding, brazing, and resistance welding.

The second production, "How to Rivet Aluminum", runs 26 min. This demonstrates and describes the making and testing of rivets—how to prepare for the work, plus actual rivet driving techniques.

The third picture, "How to Machine Aluminum" (running time 32 min.), covers alloys, kinds and shapes of tools, cutting compounds, speeds and feeds.

These films, while complete, are primarily intended to give the new aluminum worker a general picture of welding, riveting, and machining. They are preliminary to the actual shop and bench work which follows.

Requests for these films should be addressed to the Aluminum Co. of America, Gulf Bldg., Pittsburgh.

Here and There With A. S. M.'ers

J. M. Watson

Walter R. Meyer

H. L. Harvill

A. S. M. PAST PRESIDENT J. M. (MIKE) WATSON is now in Washington as technical advisor to the Office of Civilian Supply, Supplies and Requirements Branch.

* * *

H. L. (RED) HARVILL, a pioneer in the field of aircraft die castings, has announced his reentrance in this field as head of his own organization, H. L. Harvill Co.

Mr. Harvill is a member of the Los Angeles Chapter of the Society, as is S. I. GLEASON, who will be metallurgist for the new company.

The H. L. Harvill Co. will specialize in centrifugal, pressure, and die castings, as well as permanent molds. Plant and property have been purchased and modern equipment installed, much of which is of special Harvill design.

* * *

WALTER R. MEYER, who has become technical director of The Enthone Co., New Haven, Conn., will direct the development of new products and processes for the metal finishing industry, as well as applications of the company's products to the finishing of war goods.

Well grounded in chemistry with a B.S. from Sheffield Scientific School of Yale University in 1928, Dr. Meyer received his Ph.D. in metallurgy at Yale ten years later. Since then he has been editor of *Metal Finishing* and four editions of *Plating and Finishing Guidebook*. His previous connections were as plant metallurgist for Sargent & Co. and electrochemist and metallurgist for General Electric Co.'s Bridgeport, Conn., plant.

Dr. Meyer is widely known for his technical publications and lectures; he is a member of the A.S.M., Electrochemical Society, American Electroplaters' Society, Electrodepositors Technical Society (England), Faraday Society, and Sigma Xi.

* * *

WELTON J. CROOK, a charter member and past chairman of the Golden Gate Chapter A.S.M., professor of metallurgy, on leave, at Stanford University, Calif., has been promoted from lieutenant colonel to colonel, Ordnance Department, U. S. Army.

Colonel Crook has been stationed at Rock Island Arsenal, Rock Island, Ill., since November 1940 and is assigned as technical officer and officer in charge, Steel Foundry Division.

* * *

S. PROCTOR RODGERS, a former officer of the Baltimore Chapter, is no longer with the Consolidated Gas, Electric Light & Power Co. of Baltimore, but is now chief of the Fuel Section of the Army and Navy Munitions Board in Washington.

* * *

COL. GLEN F. JENKS, past president, American Welding Society, has retired from active service with the U. S. Army Ordnance Department, and has accepted a position as consulting engineer, Taylor-Winfield Corp., Warren, Ohio.

Colonel Jenks will continue his activities in cooperative research with the Welding Research Committee, American Society for Testing Materials, A.S.M., and other organizations.

Data on Cast Iron Solicited for Survey

The War Production Board has approved a field research project to study the possibility of utilizing cast iron at high temperatures.

This program is being conducted by the War Metallurgy Committee, National Academy of Sciences, with the cooperation of the American Foundrymen's Association. T. E. Barlow, Vanadium Corp. of America, and C. O. Burgess, Union Carbide and Carbon Research Laboratories, have been appointed to obtain the desired data.

Engineers, foundrymen, and others who have information on performance records of cast iron at elevated temperatures can make a valuable contribution to the war effort by adding their knowledge and experience to this study.

Detailed information or suggestions should be sent to either T. E. Barlow, 2440 Book Bldg., Detroit, or C. O. Burgess, 4625 Royal Ave., Niagara Falls, N. Y.

Parker Returns For Joint Meeting With A. S. M. E.

Reported by R. L. Rickett
U. S. Steel Corp. Research Laboratory

New Jersey Chapter—An invitational meeting, at which members of the Metropolitan Section, American Society of Mechanical Engineers, were guests, was held on Nov. 16 in Newark.

A coffee talk on "Atmospheres" had been scheduled, but the speaker was unable to be present. The gap thus left was ably filled by a member of the Executive Committee of our own Chapter, Dr. S. Skowronski of the International Smelting and Refining Co.

Dr. Skowronski spoke on "Metals in the War", and compared the metal resources of the United Nations with those of our enemies.

At the technical meeting that followed, Charles M. Parker, secretary of the General Technical Committee of the American Iron and Steel Institute, spoke on "The Relationship of the Physical Properties of Steel to Its Chemical Composition and Internal Structure".

This was the second appearance in Newark of the year for Mr. Parker, who was one of the speakers on the NE steel program held during the summer. The "return engagement" was at the request of numerous members of the Chapter who wanted to hear more of the story that Mr. Parker had necessarily condensed during his previous visit.

The speaker discussed the significance of those properties of steel that are of most interest to the engineer, particularly the tensile properties, and described the way in which they are measured.

He then went on to show how the science of metals, based on a knowledge of atomic and crystalline structure and the influence of microstructure on mechanical properties, makes it possible to develop new compositions intelligently.

A lively and extended discussion period followed the lecture. Nearly all the questions were submitted in written form, on cards which had been distributed for that purpose.

Employment Service Bureau

Address answers care A.S.M., 7301 Euclid Ave., Cleveland, unless otherwise stated.

POSITIONS OPEN

FOUNDRY SUPERVISOR: For steel foundry producing small and medium castings from a 1000-lb. Lectromelt furnace. Must have qualifications to control melting and molding of castings by the electric furnace process and to supervise men. Baltimore. Box 12-5.

FORGEMASTER: Aircraft Mechanics, Inc., of Colorado Springs, Colo., wants experienced forgemaster, capable of supervising all production work in aircraft parts forging plant. Excellent "after the war" possibilities. Begin at $300 monthly. Do not apply unless you are experienced in use of intricate die forging hammers. Apply to Harry R. Elliott, employment supervisor.

METALLURGIST: Well-qualified man with extended experience with stainless, tool, and alloy steels. Must be able to assume responsibility and direct laboratory organization. Excellent opportunity. Pennsylvania. Box 11-20.

METALLURGIST: For manufacturer of radio tubes. Investigating troubles with metals, analysis (both ferrous and non-ferrous), some specification writing. Salary open; will consider applicant just out of school, but some industrial experience preferred; must be draft exempt. Day work; New England. Every indication points to post-war activity. Box 12-10.

METALLURGIST: Executive type, to take charge of plant operations for industrial furnace and heat treating firm. Chicago district. Box 12-15.

ENGINEER: Acquainted with metal manufacturing equipment and process, for staff of public relations firm. Duties would be writing for trade papers. Reply to Hill and Knowlton, 1454 Guildhall Bldg., Cleveland, Ohio.

MANUFACTURER'S AGENT: New firm manufacturing high frequency induction heat treating equipment especially designed for production desires representation by established sales engineering firms in all territories except Metropolitan New York. Box 12-30.

METALLURGIST: For research and development of beryllium and beryllium alloys. Cleveland area. Give all particulars and send photograph. Box 12-35.

MATERIAL ENGINEER: Metallurgical, aircraft, or related experience, for specification and standardization work with large producer of wrought non-ferrous alloys. Salary open. Box 12-40.

POSITIONS WANTED

METALLURGICAL ENGINEER: Ph.D., desires position in a university as chairman, department of metallurgy. Teaching and industrial experience. Box 12-20.

CHIEF METALLURGIST: Or assistant, in charge of research, development or investigation, or would consider consulting work with small industries, particularly on ordnance or other war work. Age 29, Ph.D. University of Notre Dame. Teaching and consulting experience; naval ordnance duty. Box 12-25.

V 15 1 10
DEC 42
XUM

Machinability Succumbs to St. Louis Falls

Reported by H. E. Hostetter
Metallurgical Engineer
Climax Molybdenum Co.

St. Louis Chapter, at the October meeting, wrestled with that old campaigner, "Machinability", and although no decision was rendered after two falls, sufficient information was obtained on the veteran's tactics that he should prove an easy victim when next encountered by those who were present.

Albert H. Grosch of the St. Louis Office of the Aluminum Co. of America presented a sound movie, "How to Machine Aluminum", as the short topic of the evening.

It was emphasized that in the machining of aluminum the amount of top rake, side rake and clearance of the tools should be greater than for steel. Keen cutting edges, high speeds and generous amounts of coolant are also of importance.

Speaking on the topic, "Machinability of Metals as Affected by Cutting Oils", J. T. Beard, engineer, Socony-Vacuum Oil Co., New York, spent some time in explaining the fundamental principles of metal cutting, before considering the role of cutting oils. A magnified slow motion movie of a planer tool in action was used to illustrate the function of the built-up edge and the differences in machining of ductile and brittle metals.

The factors generally considered in any discussion of machinability are tool life, rate of metal removal and surface finish. The functions of a cutting fluid are:

1. The minimizing of friction.
2. The localizing of rubbing action of the chip away from the cutting edge.
3. The prevention of excessive build-up.
4. The minimizing of tool vibration.
5. The removal of heat.

The properties of a cutting oil that affect its performance of these functions are:

1. Pressure resistance.
2. Lubricity.
3. Anti-weld property.
4. Cooling efficiency.

Mr. Beard was most successful in pointing out how the properties of the oil affect each of its functions as a cutting fluid, and how in turn these affect the factors of machinability.

WANTED
Impact testing machine, Charpy type. State model, condition, price, etc.
Address Box 12-1
American Society for Metals
7301 Euclid Ave. Cleveland, Ohio

CHAPTER CALENDAR

CHAPTER	DATE	PLACE	SPEAKER	SUBJECT
Boston	Jan. 9	Room 6-120, M.I.T.	Zay Jeffries	Sauveur Night
Buffalo	Jan. 14	Hotel Statler		Past Chairmen's Night
Calumet	Jan. 19	Woodmar Country Club, Hammond, Ind.	M. A. Grossmann	Hardenability and Quenching of Steel
Canton-Mass.	Jan. 14	Elks Club	J. H. Van Deventer	Metallurgy Goes to War
Chicago	Jan. 14	Chicago Bar Assoc.	H. J. French	Alloys and Emergency Alloy Steels
Cleveland	Jan. 4	Cleveland Club	Carl E. Swartz	Some Aspects of Modern Bearing Technology
Dayton	Jan. 13	Engineers Club	F. B. Doane	Magnaflux, Magnaglo, and Zyglo
Detroit	Jan. 11	Horace H. Rackham Educational Memorial	M. A. Grossmann	Evaluation of Hardenability From Chemical Composition
Hartford	Jan. 12	Hartford Electric Light Co.	John A. Comstock	Prevention of Decarburization in Aircraft Engine Parts
Indianapolis	Jan. 18	Washington Hotel	Wm. G. Theisinger	World's Largest Plate (Film)
Lehigh Valley	Jan. 8	Hotel Traylor, Allentown, Pa.	J. C. Fox	Die Castings
Milwaukee	Jan. 13	Milwaukee Athletic Club	H. J. French	Alloys and Emergency Alloy Steels
Montreal	Jan. 4	Windsor Hotel	C. K. Lockwood	Heat Resisting Alloy Steels
New Haven	Jan. 21	Derby Gas & Electric Co., Derby, Conn.	R. M. Brick	Testing Methods
New Jersey	Jan. 18	Essex House, Newark	E. S. Davenport	Isothermal Transformation in Steel
New York	Jan. 11	Bldg. Trade Employers Association	Wayne E. Martin	Non-Ferrous Metallurgy
North West	Jan. 11	Coffman Memorial Union, Univ. of Minn.	H. J. French	Alloys and Emergency Alloy Steels
Notre Dame	Jan. 13	Engineering Auditorium, Univ. of Notre Dame	E. R. Young	Steel Castings
Ontario	Jan. 8	Royal York Hotel, Toronto	John Wulff	Powder Metallurgy
Peoria	Jan. 11	Caterpillar Tractor Co.		"Information Please" Program
Philadelphia	Jan. 29	Engineers Club	A. V. deForest	New Pathways in Engineering
Pittsburgh	Jan. 14	Roosevelt Hotel	A. V. deForest	Recent Developments in Physical Testing of Metals
Rhode Island	Jan. 6			"January Thaw"
Rochester	Jan. 11	Chamber of Commerce	Vernon Cook	Metallizing
Rockford	Jan. 27	Elks Club	Howard J. Slagg	Hardening of Tool Steel
Saginaw Valley Group	Jan. 19	Bancroft Hotel, Saginaw, Mich.	J. D. Corfield	Steel Castings
Springfield	Jan. 18		Haig Solakian	Tool and High Speed Hardening in Salt Baths
Syracuse	Jan. 5	Onondaga Hotel	H. P. Rassbach	Electric Steel Melting
Toledo Group	Jan. 25	Hillcrest Hotel	Ralph Perrine	Furnace Atmosphere
Tri-City	Jan. 12	Hotel Fort Armstrong, Rock Island, Ill.	H. J. French	Alloys and Emergency Alloy Steels
Washington	Jan. 11	Garden House, Dodge Hotel	J. C. Mathes	Magnesium in Aircraft
Worcester	Jan. 13	Sanford Riley Hall, Worcester Polytech. Inst.	Representative of WPB	War Industry Problems and Progress
York	Jan. 13	York, Pa.	F. G. Tatnall	Physical Testing

All Rubber Substitutes Are Plastics Chicago Told at Ladies' Night

Reported by Alfred F. Finkl
Vice-President, A. Finkl & Sons Co.

Chicago Chapter—Appropriately devoted to "Plastics", the monthly meeting on Oct. 8 was "Ladies' Night". Dr. Howard L. Gerhart of Pittsburgh Plate Glass Co., the speaker, avoided technical terms as much as possible and gave a general survey of the plastic field.

There are four types of plastics, namely, transparent, filament, rubber, and miscellaneous.

The speaker stated that Syron, which is a styrene compound, will be the cheapest and lightest of the transparent plastics. He also mentioned some of the interesting properties of Lucite.

In discussing the filament type of plastics, Dr. Gerhart emphasized the changes that take place during extrusion. What is originally a sticky, unpromising mass becomes a coherent filament.

Its good properties are brought about by the alignment of molecules during extrusion, a phenomenon that Dr. Gerhart explained by means of a ball of paper clips joined together. When matted together the result was a nondescript mass, but when pulled out the paper clips aligned themselves in an orderly row.

Dr. Gerhart pointed out that all of the rubber substitutes now being investigated are really plastics.

Under the miscellaneous types of plastics the speaker mentioned chewing gum plastics, anti-intoxicant plastics and phosphorescent plastics.

In summing up the advantages for plastics, Dr. Gerhart pointed out that there is no law of nature which says that plastics cannot be as strong as metals. However, he also pointed out that light metals are being improved almost as much as plastics, and that plastics have certain inherent defects. Two of these are that they are affected by moisture and cannot be held to close dimensions.

Dr. Gerhart had a large number of plastic articles with which he illustrated his various points.

Ernst Predicts Future Of Metal Cutting

Reported by Stewart M. DePoy
Metallurgist, Delco Products Div.

Dayton Chapter—Coffee speaker at the meeting on Nov. 11 was Charles L. Brennan, coordinator of civilian defense for Montgomery County. He gave a very enlightening talk on local civilian defense accomplishments and aims.

Following the dinner a crowd of approximately 200 members and visitors listened to a lecture on "Machinability and Metal Cutting Research" given by Hans Ernst, director of research, Cincinnati Milling Machine Company.

Mr. Ernst is considered one of the foremost authorities in the metal cutting field of research, and his prediction of the future of metal cutting was revolutionary.

Girardi Instructs Rockford Class On Alloy Effects

Reported by Wilhelm Olson
The Atwood Vacuum Machine Co.

Rockford Chapter has begun the fall season with a program that promises to be both interesting and effective.

Building on the groundwork that has been laid down in the past three seasons, the Chapter, in cooperation with the University of Illinois, is sponsoring a series of lectures on "Effect of Alloys on Steel". Dr. D. J. Girardi of the department of mining and metallurgy, University of Wisconsin, is the instructor of a class of 55 members.

D. J. Girardi

Regularly scheduled monthly meetings are also held, and speaker at the latest of these was Bert C. Swett of Miller & Co., United States representatives of Chrome Mining and Smelting Corp.

He described several alloying elements bonded with sodium nitrate, which causes an exothermic reaction, permitting ladle additions without loss of heat. Several of these products including Chrom-X, Sil-X and Fer-X are already in commercial service, but others, although past the experimental stage, must wait until after the war for commercial application.

Interested listeners kept the speaker busy answering more specific questions after the general question period closed.

One of the points which was of great interest to those present was the fluxing and cleansing action of the sodium silicate slag which is developed from all of the "X" materials.

Enough wire can be made by the steel industry in one year to circle the earth 6544 times—or reach almost to the sun and back again.

Boron Symposium Set

The Molybdenum Corp. of America, in conjunction with the University of Pittsburgh, is holding a symposium on the detection of small amounts of boron by chemical and spectrographic methods at the University of Pittsburgh on Dec. 21.

This meeting will be under the direction of Dr. Warga, University of Pittsburgh, and J. Alfred Berger, research metallurgist, Molybdenum Corp. of America.

Those who are interested in this subject should contact the Molybdenum Corp., Grant Building, Pittsburgh.

Bring Your Metallurgical Library Up-To-Date—
Check The Books That Will Help You—
And Order Today!

Alloy Constructional Steels, by H. J. French	$ 4.00	Metals—How They Behave in Service, Series of Five Lectures	1.00
Alloying Elements in Steel, by Edgar C. Bain	4.00	Modern Steels, Series of 12 Lectures	3.50
Application of Science to the Steel Industry, by W. H. Hatfield	2.50	Open-Hearth Steel Making, by Earnshaw Cook	2.50
Book of Stainless Steels, Edited by Ernest E. Thum	5.00	Physical Testing of Metals, by H. D. Churchill	2.00
Engineering Alloys, by N. E. Woldman and A. J. Dornblatt	10.00	Powder Metallurgy, Edited by John Wulff	7.50
Forging Handbook, by Waldemar Naujoks and Donald C. Fabel	7.50	Practical Metallurgy, by George Sachs and Kent R. Van Horn	5.00
Hardness and Hardness Measurements, by S. R. Williams	7.50	Principles of Heat Treatment, by M. A. Grossmann	3.50
Heat Flow in Metals, by J. B. Austin	2.50	The Pyrometry of Solids and Surfaces, by R. B. Sosman	2.00
Inclusions in Iron, by C. R. Wohrman	3.00	Quenching of Steels, by H. J. French	2.50
Inspection of Metals, by Harry B. Pulsifer paper, $1.00 cloth	1.50	Steel Physical Properties Atlas, by Charles Newman Dawe	2.50
Machining of Metals, Series of Five Lectures	2.50	Strength of Metals Under Combined Stresses, by Maxwell Gensamer	2.00
Metal—Inside Out, Series of Six Lectures	2.00	The U. S. Patent System, by John A. Dienner	1.00
Metallographic Technique for Steel, by J. R. Vilella	2.00	Visual Examination of Steels, by George M. Enos	2.00
Metallurgical Dialogue, by Albert Sauveur (Autographed)	3.00	What Steel Shall I Use?, by Gordon T. Williams	3.50

Send me the books checked above. I enclose bank check or money order for $_____

Name _____ Address _____ City and State _____

7301 EUCLID AVENUE AMERICAN SOCIETY FOR METALS CLEVELAND, OHIO

V 15 I 10

DEC

4

2